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ABSTRACT

This paper applies John Carroll's model of school learning (which emphasizes the crucial role of time) to analyze the success of college students with deafness in mainstreamed settings. It relates especially to services provided by the National Technical Institute for the Deaf to deaf students in mainstreamed courses at the Rochester (New York) Institute of Technology (RIT). The model defines the five crucial factors required for success in an educational setting in terms of time: (1) aptitude (time required to learn); (2) ability to understand instruction (time required to learn); (3) perseverance (willingness to spend time in learning); (4) opportunity to learn (time on task); and (5) quality of instruction (which influences the use of time). Each of these five factors is discussed in terms of how they are applied in the case of successful deaf students. The effective management and use of time are felt to contribute to the graduation rate of about 60 percent among RIT deaf students. (DB)

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Success in Earning a Baccalaureate/Master's Degree: It's All a Matter of Time

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The National Technical Institute for the Deaf (NTID) provides resources for college students who are deaf and who are mainstreamed into the programs and courses of the other colleges of the Rochester Institute of Technology (RIT). These students have achieved notable success over the years in continuing with their education and graduating from RIT with a bachelor's and/or a master's degree. The graduation rate among RIT deaf students is around 60% which is comparable to that of their hearing peers.

At a practical level, the success of deaf students at RIT can be attributed to an effective system of student services and dedication of resources, as well as to the personal characteristics of the students themselves. This paper, however, considers the success of these students from the more theoretical perspective of the John Carroll (1963) model of school learning. This model emphasizes the crucial role of Time in determining student learning and progress.

Specifically, the Carroll model identifies crucial factors required for success in an educational setting and relates them to time as a variable rather than a constant. Thus, Aptitude is defined as time required to learn. The same is true for Ability to Understand Instruction. Perseverance is the willingness to spend time in learning and to face and overcome failure. Opportunity to Learn is defined as time-on-task. A final variable of importance is Quality of Instruction which influences the use of time.

The success of mainstreamed, RIT deaf students at the baccalaureate and masters' degree level can be related to the five parts of the Carroll model mentioned above in terms of three categories of experience at gained at RIT. The first of these categories is the development of a system of student services by NTID. The second is experience during the the 25 year history of mainstreaming at RIT. The third is the growth in the self-identity of deaf students. These

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relationships between the Carroll model and the categories are shown in the chart below.

The Mainstreaming of Students Who are Deaf at RIT from the Perspective of the Carroll Model of School Learning

Carroll Model	Time to a BS/MS Degree		
	NTID Services to Students	The Experience of 25 Years at RIT	Student Self-identity
Aptitude - time required to learn			
Ability to understand instruction			
Perseverance: -devote time -cope -face failure			
Opportunity to learn - time allowed for task completion			
Quality of Instruction - suited to student needs			

The Carroll model applied to the mainstreaming experience of students who are deaf at RIT will provide the organization for the remainder of this presentation. The concerns shown within some of the individual cells of the chart will be discussed as they apply to each category.

The relationships being presented are not intended to be prescriptive. They are, rather, offered as a challenge to consider the factors which may influence the success of deaf students in college from a different perspective, that of the use of time.

Aptitude

According to the model, Aptitude is defined as Time Required to Learn rather than a fixed or immutable cognitive characteristic of an individual. Deaf students at RIT have the opportunity to start at many different points in the degree process: earn an Associate's degree at NTID, enter a Pre-baccalaureate program with NTID's Center for Baccalaureate and Graduate Studies (CBGS), or enter directly into a baccalaureate program in one of the other colleges.

Time to achieve a degree varies with the student's entry level skills and progress in acquiring new ones. Thus, an otherwise-able student will not be penalized for lack of previous instruction or the lag in educational development that is often seen in students who grow up having to deal with a socially-defined disability. This is particularly true of deafness which influences the development of spoken and written language.

Aptitude as time-to-learn also allows the highly motivated student to progress to the maximum level of educational degree possible for his/her true ability. If the student is willing and able to invest the time, success in completing a program and earning a degree is within reach. Most deaf students at RIT do, in fact, require more time to progress through their programs, adding a year or more to the time required for a degree.

Deaf students at RIT have the advantage of observing the progress of other deaf students through degree programs, gaining the skills necessary to success along the way. They are able to learn from these experiences that a disability is only what society makes it out to be and not a lack of ability. And, that allowing sufficient time for learning also allows for success in achieving a degree.

Ability to Understand Instruction

Learning Styles

Until recent years the pedagogy of classroom instruction embodied the implicit assumption that all individuals learn in much the same way. Therefore, those who learned easily and well under traditional methods of instruction were considered more able than those who did not.

More recently there has been an effort to closely scrutinize the characteristics of those students who appear to be able but who are

unable to learn or learn well within the traditional educational context. Such students have been labeled as dyslexic, learning disabled, etc. indicating that they are in some way lacking in their ability to learn and require special education to remedy their deficiencies.

Currently, we are finally beginning to realize that such individuals are not so much deficient or disabled, but that they learn best in ways that are not typically a part of traditional pedagogic methods. Thus, the most recent label or designation in use for this group of individuals is Alternative Learning Styles. This designation gives integrity to an individual's personal style and way of approaching learning. Success in learning is achieved with the appropriate instructional methods, instructional materials and the learning strategies of the students themselves.

Too often in the past the lack of educational success among deaf students was assumed to be a result of deafness, itself, implicitly making some disciplines unattainable by these individuals. That is, certain deficiencies were a part of being deaf. To the contrary, the experience of persons working with deaf students at NTID has paralleled the more general experience found concerning all students, that there are different ways of learning, all of equal integrity. Some deaf students may, in fact, have learning styles such as a spatial orientation rather than linear orientation. However, such learning styles will exist among hearing persons, as well and are not of themselves a disadvantage.

Facility in the use of language is also part of the ability to understand instruction. Among students at RIT that language is English as our primary language. It goes without saying that students who have difficulty in using English will find it a struggle to learn in any college level course. Intensive instruction to develop English reading and writing skills and to improve comprehension helps deaf students at RIT to achieve the English proficiency needed to be a successful.

Communication

Another way to look at the ability to understand instruction is from the more self-evident, pragmatic viewpoint of communication, primarily the communication between instructor and students. This concern for facilitating communication has led, for the most part, to

the development at RIT of a variety of student services also known as student resources or support services.

Deaf students come to understand their need for services in a positive sense. This need is not an indication of their lack of ability. It is time spent, a necessary component in ensuring their ability to understand instruction.

The provision of oral and/or sign language interpreters within the classroom makes it possible for students to better understand their instructors, to understand what other students are saying, and to participate in discussion or ask questions themselves. Notetakers, by recording what is presented in the class lecture, also enhance a student's access to information and ability to understand instruction. Outside of the classroom, tutors assist students in understanding instruction by explaining and amplifying the information that was presented.

Over the years we have learned that the classroom instructor is the primary person in providing deaf students with access to information and the ability to understand. At RIT instructors have become accustomed to the services provided to deaf students in their classes. They have learned that interpreters are in the classes to enable them to communicate with their deaf students.

Teaching faculty may, also, work with NTID faculty who provide student services to modify their lecture methods in order to benefit deaf students. Such modifications could mean adding more visual aids in the form of overheads and the like. It has generally been found to be true that these modifications in instruction benefit the learning of all students, hearing as well as deaf. Many instructors learn enough basic sign language to communicate with their deaf students, also. Deaf students, working together, can help one another in gaining understanding of instruction from their own perspectives.

Perseverance

Deaf students must be willing to persevere in pursuit of their goal of attaining a college degree despite many obstacles. Three of the obstacles which will test this ability are the extended amount of time required as shown in the previous parts of the model; the need to cope with the difficulties of learning in a predominantly hearing university; and the need to face failure and discouragement.

Devote Time. Being willing and able to put in the extra time necessary to achieve a degree continually tests a student's commitment to his/her goals. This is true for both the time to learn and the ability to understand instructional variables discussed above. In a world that has become increasingly demanding of the quick-fix, instance gratification, easy solution approach to living this demand is often difficult to accept.

Coping. The ability to cope with the hearing world of the university is a difficult-but-necessary skill for deaf students to acquire. Laws in the US require reasonable accommodation and access to services by disabled students in higher education. Despite this, there is frequently little understanding or empathy among able-bodied members of the community for those with special needs.

Deaf students must learn to be appropriately assertive and persistent in requesting needed accommodations. They must become their own advocates as well as educators of the persons on whom they must depend for their education. Assisting deaf students in acquiring these skills is one of the goals sought through the mentoring/advising role of NTID support faculty.

Persistence. Lastly, deaf students must learn, as must other students, to face failure and not to give up but to try again. This is especially true of some deaf students who lack strong language skills or who have alternative leaning styles or who lack some of the necessary background for a course of study.

The student's ability to meet the challenges of the university, to persist, and to achieve a degree are all enhanced when they receive appropriate student services. It is also true when they find themselves accepted and encouraged by the department in which they have their major field of study. Thus, liaison with degree-granting departments is an important role for those providing student services.

Perseverance is also encouraged in students when they are in programs with other deaf students who are facing similar challenges. Such a cohort offers ease of communication and moral support to its members and cannot be over-estimated in it's value in securing student success. Also, the availability of deaf professionals as faculty and staff to serve as role models and mentors are a great asset to

students. We at NTID are fortunate to have these people among our faculty.

Opportunity to Learn

Another time-dependent factor in the model is the Opportunity to Learn which is most often known as time-on-task. Extensive research has been conducted on elementary school-age children showing that time spent in learning directly influences student achievement. Along these same lines of thinking, many of the student services provided by NTID expand the opportunities to learn available to deaf students.

The effective use of the time available gives students more opportunity to learn. NTID support faculty teach courses in time management and study skills that enable students to make the best use of their available time. The tutoring provided for courses also gives students much-needed extra time on task, or more opportunity to learn and to become successful. Opportunity to learn is also provided through computer labs and availability of other supplemental aids to learning.

RIT as the greater community also provides students with special needs more opportunity to learn. Deaf students may request additional time in taking tests if their language skills or learning styles make it difficult for them to complete an examination in a prescribed amount of time. Instructors, also, are often willing to provide students with extra help when it is requested. Deaf students who are together in a major and who study together for various courses can provide one another with more opportunities to learn, as well.

Quality of Instruction

Another factor in student learning is the quality of instruction. Some students are more sensitive than are others to poor instruction. Students who are deaf may be at high risk under such conditions. Again, student services, particularly tutoring, may help to mitigate the problems associated with poor instruction.

However, it is also possible that what is labeled as poor instruction is, rather, instruction that ignores the visual needs of deaf students. Student service faculty may work in a collegial, liaison role with the teaching faculty. In such a relationship they can often offer

suggestions such as the use of overhead transparencies and other visual aids that will help deaf students to receive and understand the information given in the classroom.

We at NTID have also found that the quality of prior learning/teaching also strongly affects a student's ability to learn and perform in a particular subject area. Mathematics is a particular example in this regard. In the recent past it was widely assumed that deaf students lacked the ability to "think abstractly" and thus would be unable to be successful in a mathematics major. However, with trend toward mainstreaming, the quality of mathematics instruction at the high school level has improved for deaf students. And, there have been, in recent years, a number of these students earning bachelor's and master's degree in mathematics at RIT.

Quality instruction for deaf students may also be linked to appropriate course placement. NTID support faculty have taken part in an effort to develop placement tests that will accurately identify student skills in such areas as mathematics and English. In one notable experience at RIT a mathematics test was developed through NTID student services in order to place deaf, freshman engineering students in the appropriate mathematics course. This test was also adopted by RIT's College of Engineering to be used with all incoming engineering freshman. Eventually this lead to the development of special, beginning calculus courses by the Mathematics Department in the College of Science. Meeting the needs of deaf students in this situation ultimately benefitted all students, both hearing and deaf.

Conclusion

In addition to classroom/academic concerns for mainstreamed students there are those in the social and personal realms where "catching up" time is often required for students with special needs. College experience becomes an important aid to the psychological/social growth of deaf individuals. NTID counselors are available to all deaf students to help them work through the many challenges they face as college students and to make satisfactory and appropriate career choices.

In this presentation I have tried to show through the example of practical experience how the effective management and use of time is important in the educational experience of post-secondary deaf students. The goal always is to empower these students as

individuals, to assist them in reaching a degree and to prepare them to be successful in the world after college.

Reference

Carroll, John B. (1963) A model of school learning. Teacher's College Record, 12: 723-733.